AYK REGION
NS/KOTZEBUE ESCAPEMENT
RPT #40

1985 KOTZEBUE AREA ESCAPEMENT SAMPLING

COMMERCIAL FISHERIES AND F.R.E.D. DIVISIONS

REGION III

Compiled by
Helen Hamner

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Introduction

During August and September of 1985, employees of Commercial Fisheries and F.R.E.D. Divisions participated in five sampling trips to collect age-sex-size data and tissue samples from chum salmon in spawning areas of the Kobuk and Noatak drainages. Tissue samples were collected for an electrophoretic study designed to use differences in allelic frequencies to distinguish between Noatak and Kobuk River stocks. In addition, since upper and lower Noatak River chum salmon spawn in ecologically distinct habitats (tributaries versus upwelling areas in the mainstem and side channels), it may be possible to separate fish from the upper and lower Noatak river based on genetic differences (Davis and Olito, 1985).

A total of 1,017 scales/skin patches and 600 electrophoretic samples were collected in the Noatak drainage; 511 scales/skin patches and 151 electrophoretic samples were collected in the Kobuk drainage (Table 1). In the lower Noatak River drainage, chum salmon were sampled from Sikusuilaq Creek (near Sikusuilag hatchery), Maratuk Slough (below Noatak village) and the mainstem Noatak River (Figure 1). In a separate trip, fish were sampled at Kelly Lake and two unnamed creeks, above the village of Noatak. Another sampling trip was to the Kugururok River, a tributary of the upper Noatak River. In the upper Kobuk River, samples were collected from Beaver Creek, Selby Slough, Selby River and mainstem Kobuk River. Samples were also collected from fish in the Squirrel and Salmon Rivers, tributaries of the lower Kobuk River (Figure 1).

A total of $4,172 (includes $360 for food and lodging in Kobuk village) was spent on commercial and charter airfare for the five sampling trips. Expenses are broken down by trips to the lower and upper Noatak and Kobuk drainages in Table 1.

Methods

Chum salmon sampled consisted primarily of live fish caught with a gillnet utilized as a seine, although some fish, near the Sikusuilaq hatcherey, were taken with a set gill net. Carcasses found on banks and beaches along the drainages were also sampled for age, sex and size.

Scales or skin patches were removed from the area on the left side of the fish above the lateral line and on the diagonal from

Table 1. Summary of 1985 sampling trips by upper and lower Kobuk and Noatak drainages.

	Lower Kobuk	Upper Kobuk	Total Kobuk	Lower Noatak	Upper Noatak	Total Noatak
Trip dates	8/20-8/25	9/10-9/16		9/16-9/23	8/23-9/9	
Airfare	$1,082	$1,113 1/	$2,195	$0	$1,977	$1,977
# scale samples	456	55	511	569	448	1,017
# tissue samples	100	51	151	200	400	600

1/ Includes $360 for food and lodging in Kobuk village.

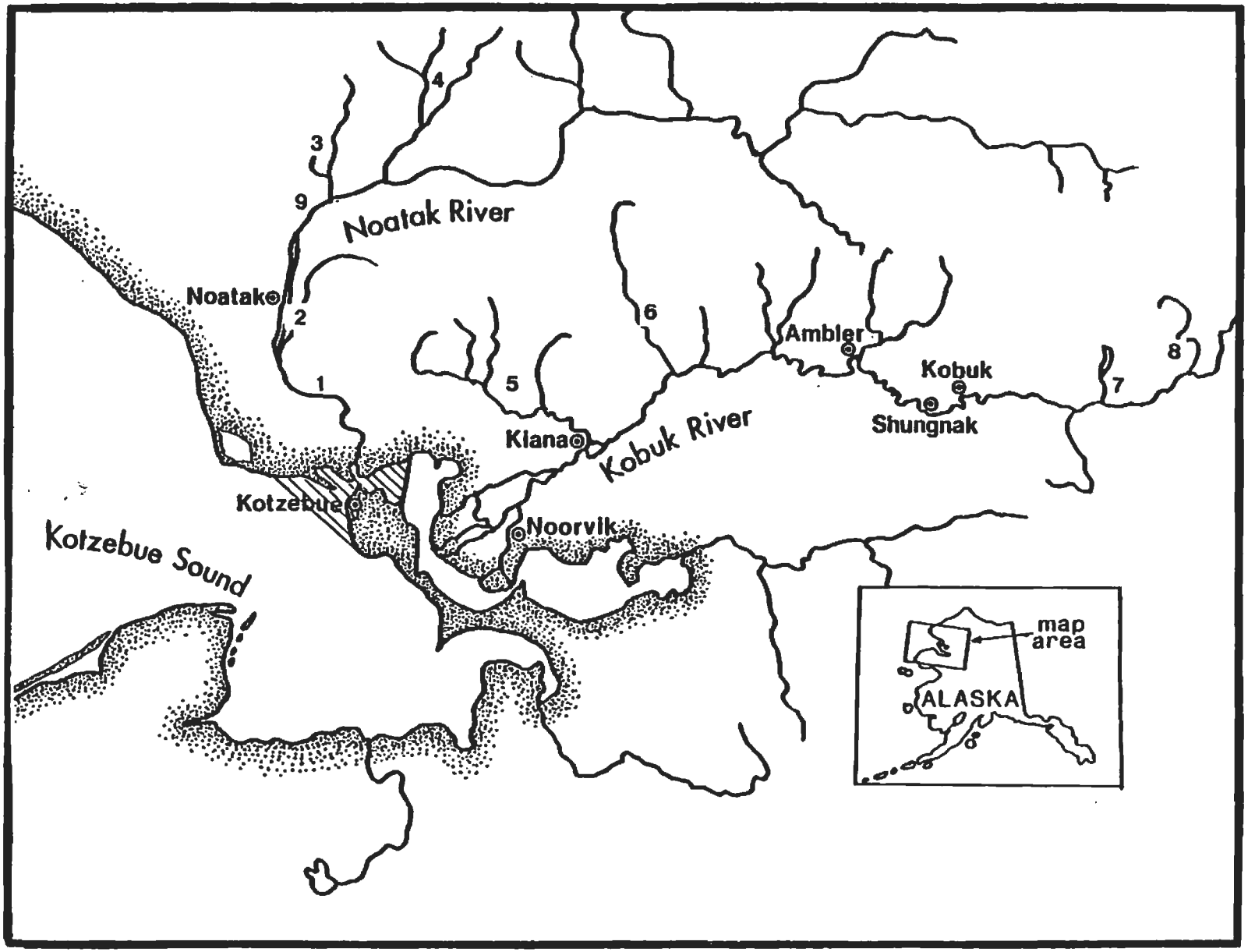

Figure 1. 1985 sampling areas: (1) Sikusuilaq Creek and hatchery, (2) Maratuk Slough and egg-take camp, (3) Kelly Lake and River, (4) Kugururok River, (5) Squirrel River, (6) Salmon River, (7) Selby Lake, River and Slough, (8) Beaver Creek, and (9) Pingaluruk Creek.

the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. Scales from skin patches were later mounted on gum cards.

Sex was determined by examining external morphology, including the snout, vent, body symetry and appearance of eggs or milt, of live fish. The sex of dead fish was determined by examining the gonads. Fish length was measured from mideye to fork of tail and recorded to the nearest millimeter.

Heart, eye, liver and muscle tissues were collected for electrophoretic analysis. Tissues were frozen upon return to Kotzebue and shipped to the F.R.E.D. Division laboratory in Anchorage.

Results and Recommendations

High water levels impeded seining operations and landing wheel planes. All crews recommended less gear be taken on subsequent sampling trips so that fewer plane trips are required. Another frequent recommendation was that scales be collected rather than skin patches. Some crews attempted to take scales but resorted to skin patches since they could not remove any scales. Since the sampling crews were not able to pull scales from fish in advanced spawning conditions, it may be helpful to have one experienced escapement sampler in each crew.

Age, size and sex composition of chum salmon from the Noatak and Kobuk Rivers will be reported in the annually published catch and escapement report for Kotzebue Sound. Results from electrophoretic analysis should be requested from Robert Davis or Carmen Olito, F.R.E.D. Division, Anchorage.

Escapement Sampling Proposal for the 1986 Field Season

Proposal: Continue escapement sampling in the Noatak and Kobuk drainages.

Justification

Management of a salmon resource requires knowledge of the magnitude, distribution and age-sex-size composition of both the harvest and escapement. The potential production of a salmon system is directly related to the age and sex composition, as well as, the numbers of fish in the breeding population. Construction of brood year tables, survival rates and stock-recruitment models are all dependent upon a historic record of the age structure of the escapement. In addition, ground-based escapement surveys provide a means of validating aerial survey estimates and may prove especially useful when weather conditions preclude flying surveys.

As the Sikusuilaq hatchery expands production, protection of the less abundant Kobuk River stocks will increasingly become an area of concern, especially in view of the Kobuk River subsistence fishery. Scale analysis, which requires scales from fish of known origin (i.e. escapement samples), may provide a means of separating hatchery and Kobuk River (and/or Noatak River) wild stocks. In addition, it may also be feasible to use scale analysis to evaluate differences in timing and abundance of hatchery and Kobuk/Noatak Rivers wild stocks in the commercial fishery.

Anticipated Costs

Project	Line Item	Purpose	Cost
Kobuk River	100	FBI- 1 mm	3.2
		FTII-1 mm	2.3
		subtotal	5.5
	200-300	commercial and charter airfare	2.2
	400	food($15/person for 30 days)	.9
		fuel and oil	.1
		camp supplies	.1
		subtotal	1.1
		Kobuk River total	8.8
Noatak River	100	FBI- 1 mm	3.2
		FTII-1 mm	2.3
		subtotal	5.5
	200-300	commercial and charter airfare	2.0
	400	food($15/person for 30 days)	.9
		fuel and oil	.1
		camp supplies	.1
		subtotal	1.1
		Noatak River total	8.6
		GRAND TOTAL	17.4

Lower Noatak River (Below Noatak Village)
September 16-23, 1985

1) Location: Noatak River - Sikusuilaq Creek (Figure 2)
Date: 9/16/85 - 27 sampled
9/17/85 - 13 sampled

*Note: We sampled all available chum salmon for scales (skin patches) out of a gill net from the creek near Sikusuilaq hatchery. Hatchery personnel are interested in the age class of these chums.

2) Location: Noatak River - North side, across from hatchery (Figure 2).
Date: 9/17/85 - 29 sampled
*Note: These chums were caught in a 25 fathom, 4 1/2" mesh gill net located across river from the hatchery.

3) Location: Noatak River - Maratuk slough; approximately 5 miles below Noatak Village (Figure 3)
Date: 9/18/85 - 150 sampled (90 females; 60 males)
9/19/85 - 256 sampled (950 females; 161 males)
*Note: Scales (skin patches) samples taken from chum salmon that were seined and used for the hatchery egg-take. It was necessary to take a large number of scale samples from this one particular area (Maratuk Slough), because it was not known at the time if there would be additional seining downriver.

4) Location: Noatak River - across from egg take camp; approximately 6 miles below Noatak Village (Figure 3).
Date: 9/23/85 - 100 sampled (42 females; 58 males)
*Note: Joni Snelgrove assisted in collecting skin patches from all chums sampled. Dave Rutz assisted on 9/19. We also collected muscle, eyeball, heart and liver tissues from 200 chum salmon.

Total chums sampled for the Lower Noatak River: 575

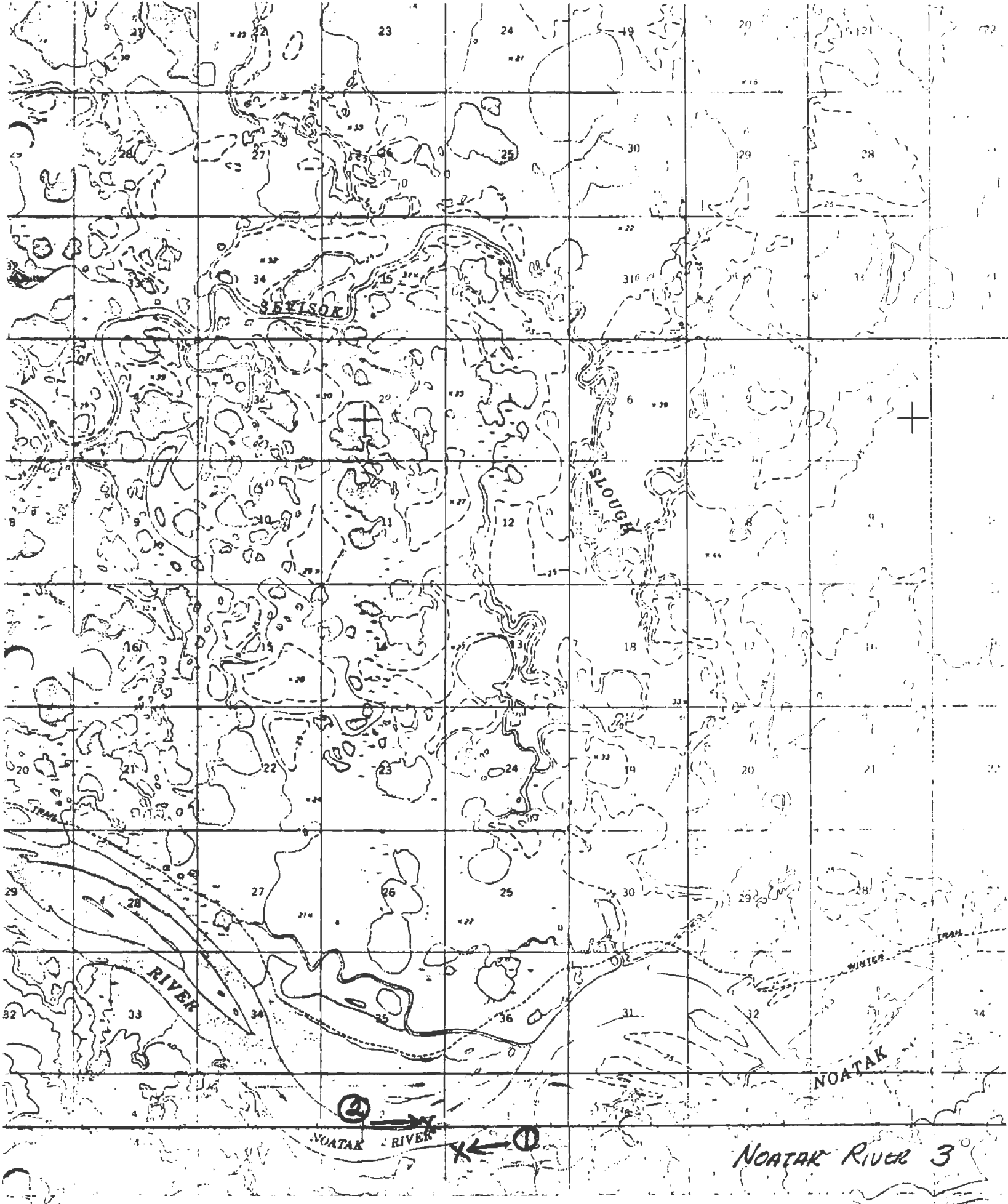

Figure 2. Noatak River (Sikusuilaq Creek and Hatchery)

Noatak A-2, B-2

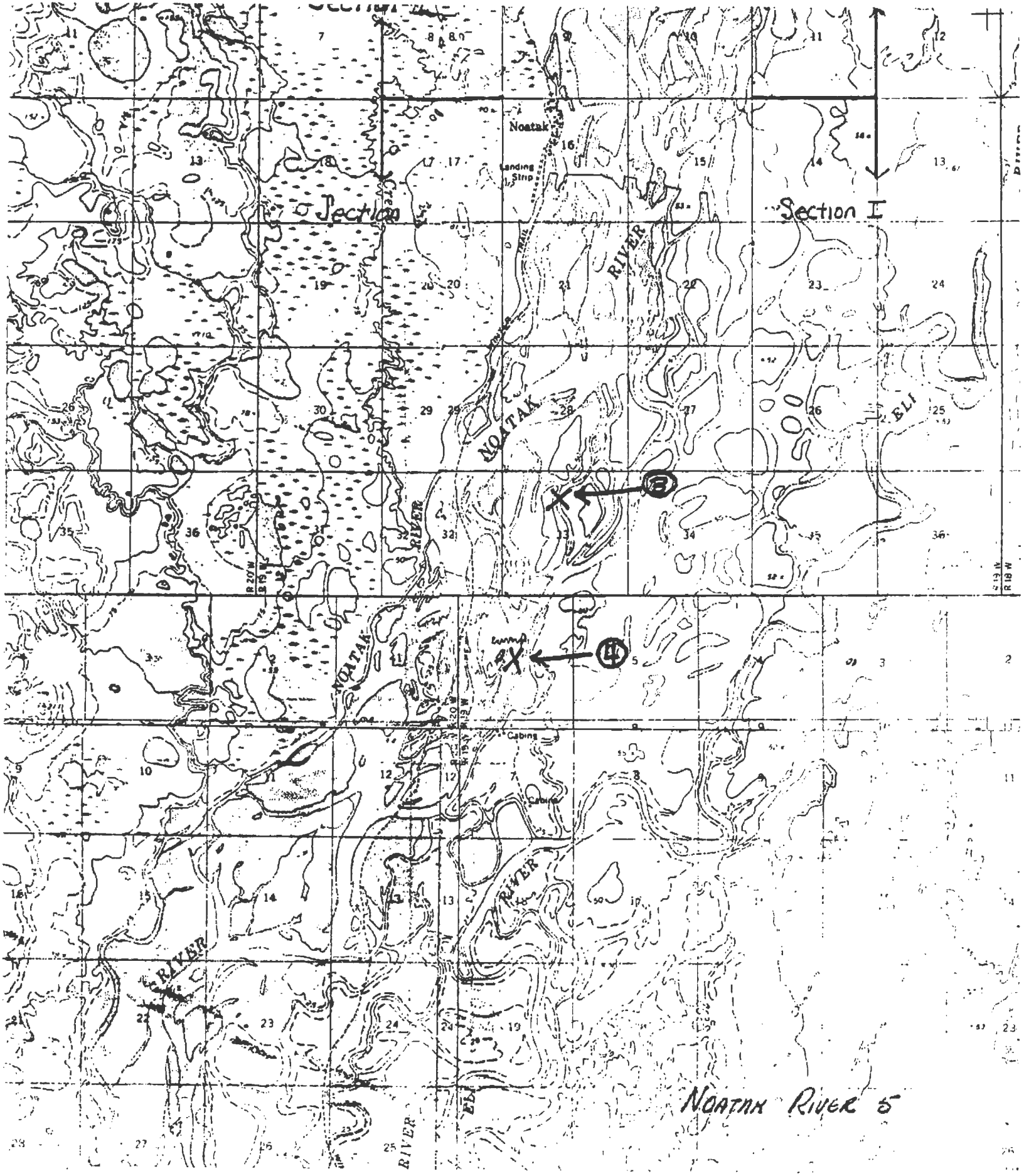

Figure 3. Noatak River (Maratuk Slough and Noatak Village).

Noatuk B-2, B-3
Noatak C-2, C-3

Upper Noatak River (Kugururok River)
August 28 - September 1, 1985

Dave Rutz flew to the Kugururok River the morning of August 28, 1985 via Jim Road's Supercub. He was dropped off approximately 6 miles from the mouth of the river. Before landing, he spotted chums on spawning grounds (Figure 4). After setting up camp, he beach seined three times, caught 110 chum salmon and sampled 100 (50 males, 50 females) of these for muscle, heart, liver, and eyeball tissues. He also collected 100 scale samples (skin patches). Total sampling time was 4-5 hours. He had some difficulty in seining alone, plus additional time was required to complete sampling.

This sampling trip could easily have been a 1-2 day trip, however, it was delayed because of rain and high water levels. The water rose 4 feet on August 29 and covered all sandbars, making it impossible for a Supercub to land. Finally on August 31, the water level dropped approximately 2 feet and on September 1 Dave Rutz was picked up.

Equipment List:
1 - 25 fathom, 4" mesh gill net (used for seining)
1 pair chest waders
camp gear
personal equipment

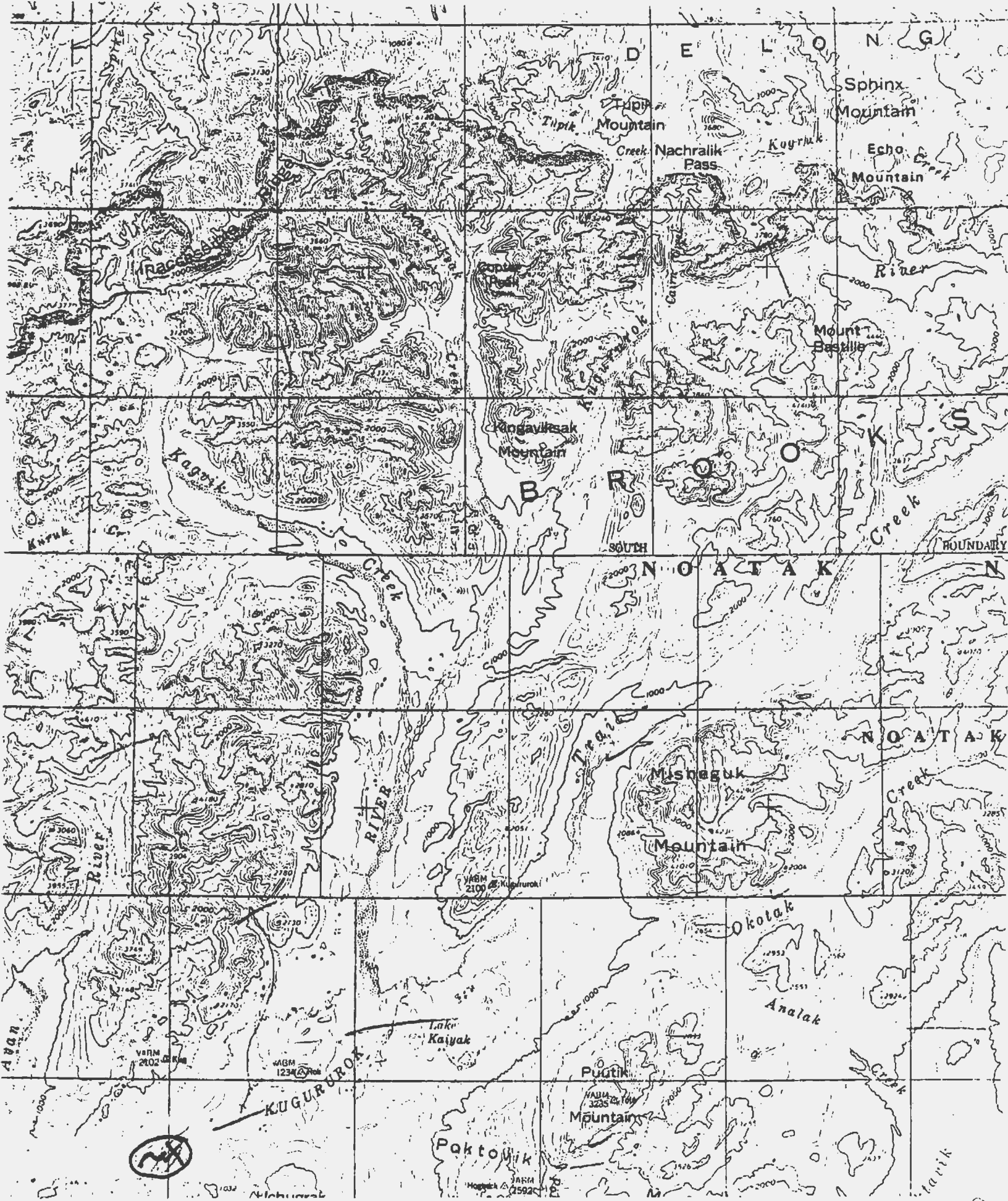

Figure 4. Kugururok River.

Upper Noatak River (Kelly Lake to Noatak Village)
September 3-9, 1985

Lisa Gluth and Dave Rutz flew from Kotzebue Tuesday morning, September 3, 1985, to Kelly Lake, the starting point of our Noatak River float trip (about one hour flight from Kotzebue) (Figure 5: #1). The valley, where Kelly Lake is located, was foggy, which made it impossible to find the lake, so we landed in a lake north of our destination and waited for the fog to lift (total ground time was approximately two hours). This ground time and extra expense could have been avoided had a current weather report been obtained before leaving Kotzebue. Approximately 1 - 1 1/2 hours later the fog lifted, so the pilot attempted to spot Kelly Lake. Dave and I had to remain on the ground due to the heavy load and take-off problems. The pilot took our gear, dropped it off at the lake, then returned for us (about a 5-10 minute flight). We finally made it to Kelly Lake in early afternoon. The pilot returned to Kotzebue and brought the second (small) load the next day. If possible, every effort should be made to have all gear flown in the same day or attempt to get by with one load. This could be done by using a smaller raft, motor, and beach seine.

Once at the lake, fish were found on the northest shore where we were dropped off (Figure 5: #1). We caught approximately 180 chum salmon in one seine haul. We collected muscle, eyeball, heart and liver tissues from 100 chum salmon (50 females and 50 males). We also collected scales (skin patches) from 150 of these fish. Total sampling time, including seining, was about 4 hours.

On Wednesday, September 4, we floated and motored across Kelly Lake and down Kelly River to the Noatak River. We arrived at the National Park Service camp at Kelly Bar in the early evening and decided to stay there overnight. The next morning our float trip was delayed again because of thick fog, however, by noon the fog had lifted enough to continue down the Noatak River. We motored/floated all day and into the late evening, searching every slough for fish, but weren't able to find many. We found only 12-15 chums in two small creeks. The water level this year was 2 - 3 feet higher and more turbid than last year at this time, thus making it more difficult to find fish in the spawning ground areas where they were found easily last year.

On Friday, September 6, we searched sloughs all day and finally found fish in a slough near Pingaluruk Creek, located about 12 miles from the confluence of the Kelly and Noatak Rivers (Figure 6: #2). We caught 103 chum salmon in four seine hauls. The total number of fish sampled for skin patches and tissues was 100 (48 male, 52 female). The total sampling time was 3-4 hours. The rain continued and caused the water level to slowly rise overnight.

On Saturday, we rafted for 5 hours, and searched for chum salmon in every slough. In the early evening we found fish in a slough approximately 1-2 miles north of Noatak Village (Figure 7: #3). We seined six times and caught 103 fish. We sampled 100 (60 females, 40 males) for skin patches and tissues. The total number of chum salmon sampled for scales (skin patches) was 350; the total number sampled for muscle, eyeball, heart and liver tissues was 300.

We motored into Noatak Village and bought gas (about 5 gallons) for the last

leg of the trip. Sunday, September 8, Dave and I arrived at Sikusuilaq Hatchery around 5:00 pm. Then Monday afternoon we returned to Kotzebue via Shellaburger's Cessna 185 float plane.

The Noatak River float trip and chum salmon sampling was completed just in time, because the water level was rapidly rising and velocity was increasing, with large amounts of debris floating down, due to heavy rains over a 5-6 day period.

Equipment List:
Noatak River - September 1985

13' Zodiac raft - smaller one would be sufficient
15 hp Evinrude motor-smaller one would be sufficient
1 25 fathom *gill net, 4" mesh (used for seining)
  * a smaller seine would be better
1 - large cooler
1 - 6 gallon gas tank (total gas used: approximately 10 gallons)
2 - duffle bags: 1 large and 1 medium size
1 pair of chest waders
personal gear: 1 medium size bag each

Float Trip Costs:

Kotzebue to Kelly Lake:
  Shellaburger - Cessna 185 on floats - $225.00 an hour
    flight time: 4.4 hrs. = $990.00
    ground time: 1.0 hrs. = $112.50

Sikusuilaq Hatchery to Kotzebue:
  Shellaburger Cessna 185 on floats - $225.00 an hour
    flight time: 1.0 hrs. = $225.00

Total cost: $1327.50

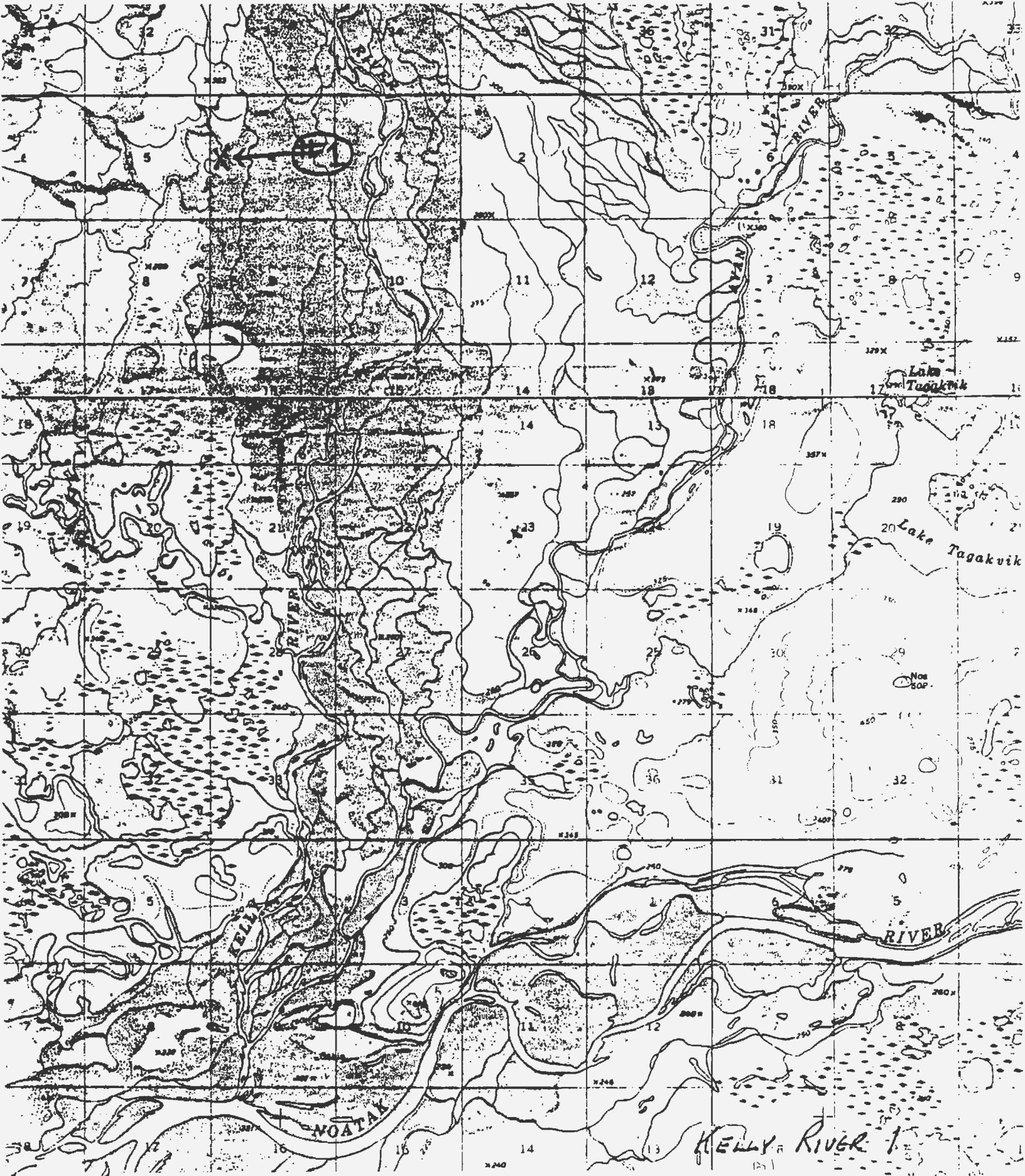

Figure 5. Kelly Lake.

Noatak D-1
Delong Mtn A-1

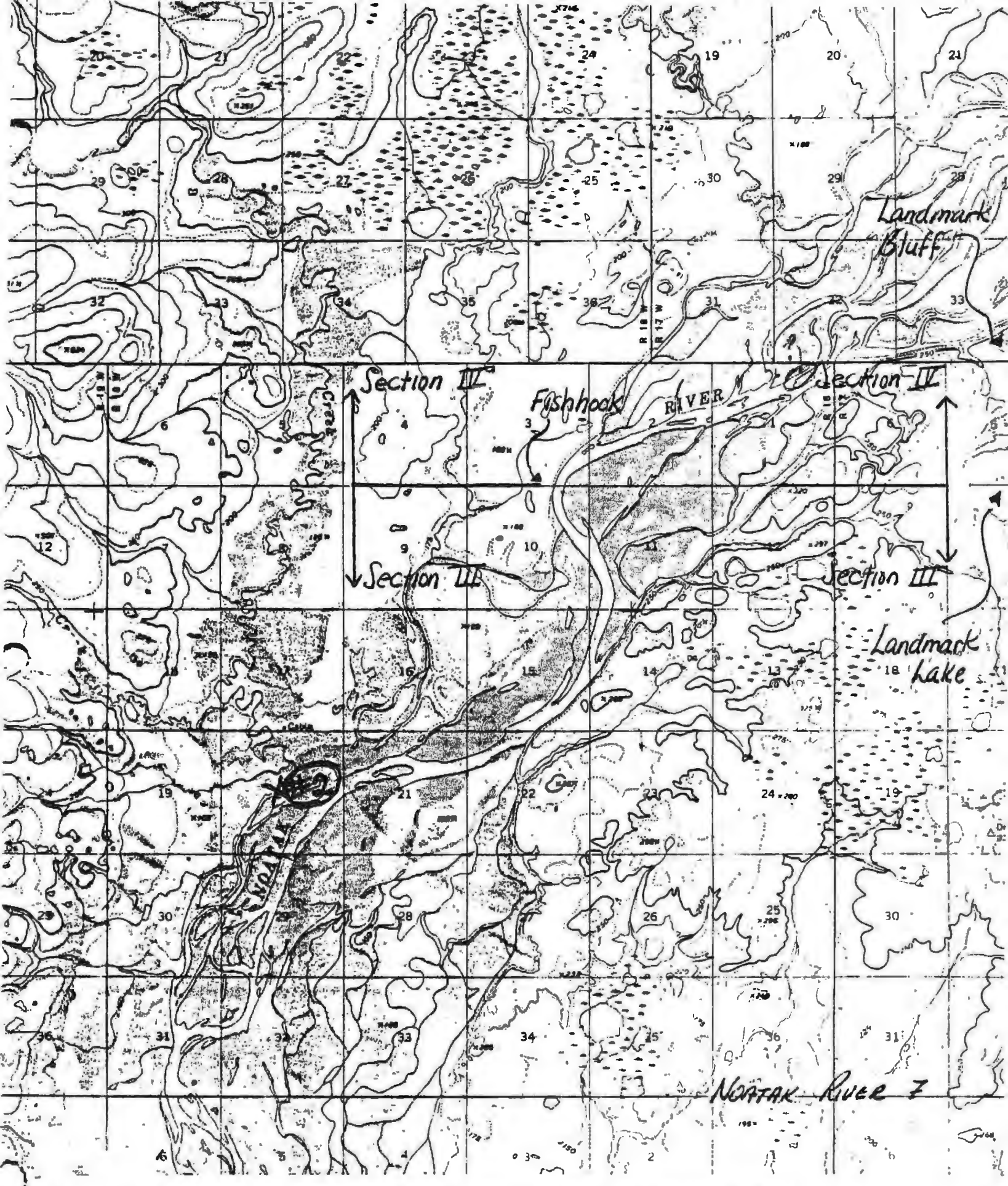

Figure 7. Pingaluruk Creek (confluence of Kelly and Noatak Rivers)

Noatak D-2

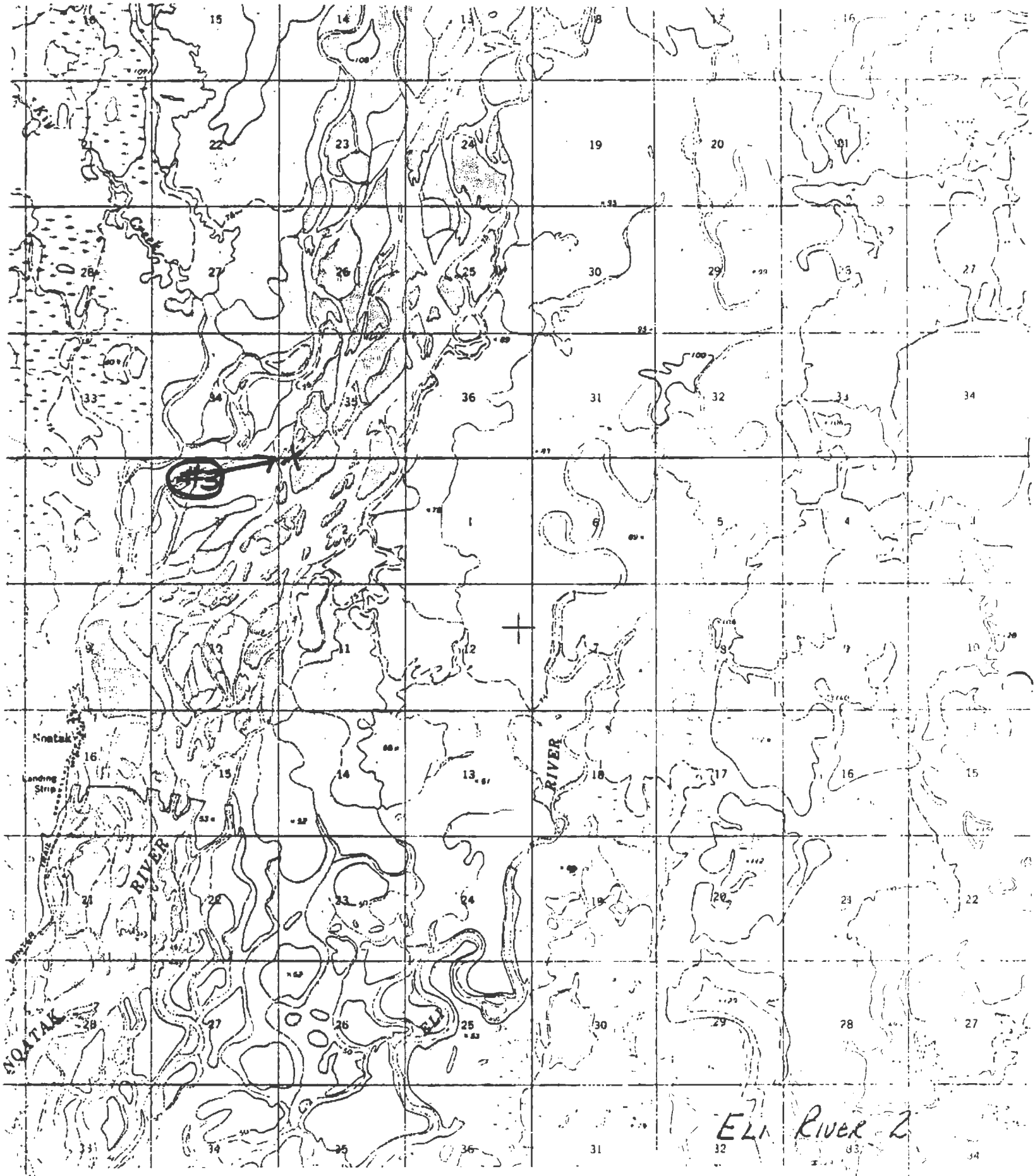

Figure 7. Noatak River near Noatak village.

Noatak C-2

Lower Kobuk River (Squirrel and Salmon Rivers)
August 20-25, 1985

Mary Hausler and Dave Rutz left Kotzebue Tuesday evening, August 20, and flew with Jim Rood in a Cessna 206 to a gravel bar on the upper Squirrel River It took two trips to get us in because of the amount of gear, but with some judicious culling it should be possible to do it in one trip. Our gear included one 13 foot Zodiac, a 15 hp Evinrude, one 6 gallon gas tank, one 25 fathom long gill net, three large duffel bags, one large cooler, and 4 small bags.

We set up camp and scouted out a spawning area one quarter mile upstream from camp. The next morning, August 21, we seined 100 chum using a 25 fathom, 4 inch mesh gill net. This worked quite well, though if space and weight are a problem one could easily get by with a shorter net. At least one person should have a pair of chest waders. We took tissue and scale samples (skin patches) from these. The total time for catching and sampling the 100 chums was 3-4 hours. Sixty-plus percent of the chum caught were spawned out. It would save a lot of time after the trip if scales, rather than skin patches were taken from the fish, and mounted directly on scale cards. This would be especially easy with the scale samples taken from the seined fish.

We packed up camp that afternoon and floated downriver for about 4 hours, camping 8-10 miles above the tower site. The next day we floated and motored to within a couple miles of Kiana. Depending on water levels, you could get picked up at one of the gravel bars below the tower site, and fly directly to the Salmon River. This year it would have been possible to fly in for the day and get 250 samples within a quarter mile of the drop-off point.

On August 22nd, we went into Kiana in the morning and flew out that afternoon to the Salmon River with Lee Staley in a Supercub on floats. It took three trips to get everything in, and it would be difficult for two people with a raft, motor, and net to do it in anything less unless they were really travelling light. We landed on the river about 7-8 miles from the mouth near the confluence of the Kitlick and the Salmon Rivers, and about one mile below the red cliffs (Figure 8). There were two long gravel bars near the landing site with lots of carcasses, and also a spawning area with over 500 chum. We sampled 150 fish on the bars that evening. The next morning we seined up the fish for tissue samples taking 135 in the first seine. We pulled out 100 for tissue samples and took skin patches from the remaining 35 and released them. Total sampling time was about 3 hours. We took the remaining 65 scale samples from carcasses in the next couple miles of river while floating downstream. We reached the river mouth at 6:00 pm and Kiana at 9:30 pm. We attempted to fly back to Kotzebue that same evening with Lee Staley, but were unable to make it due to plane problems so Lee put us up for the night. We flew out the next morning with Shellebarger's in a Cessna 207.

COSTS

KOTZEBUE TO SQUIRREL RIVER:			
CESSNA 206	$170/HR	2 TRIPS	$340
KIANA TO SALMON RIVER:			
SUPERCUB	$150/HR	3 TRIPS	$450
KIANA TO KOTZEBUE:			
CESSNA 207		1 TRIP	$192
TOTAL COST			$1,082

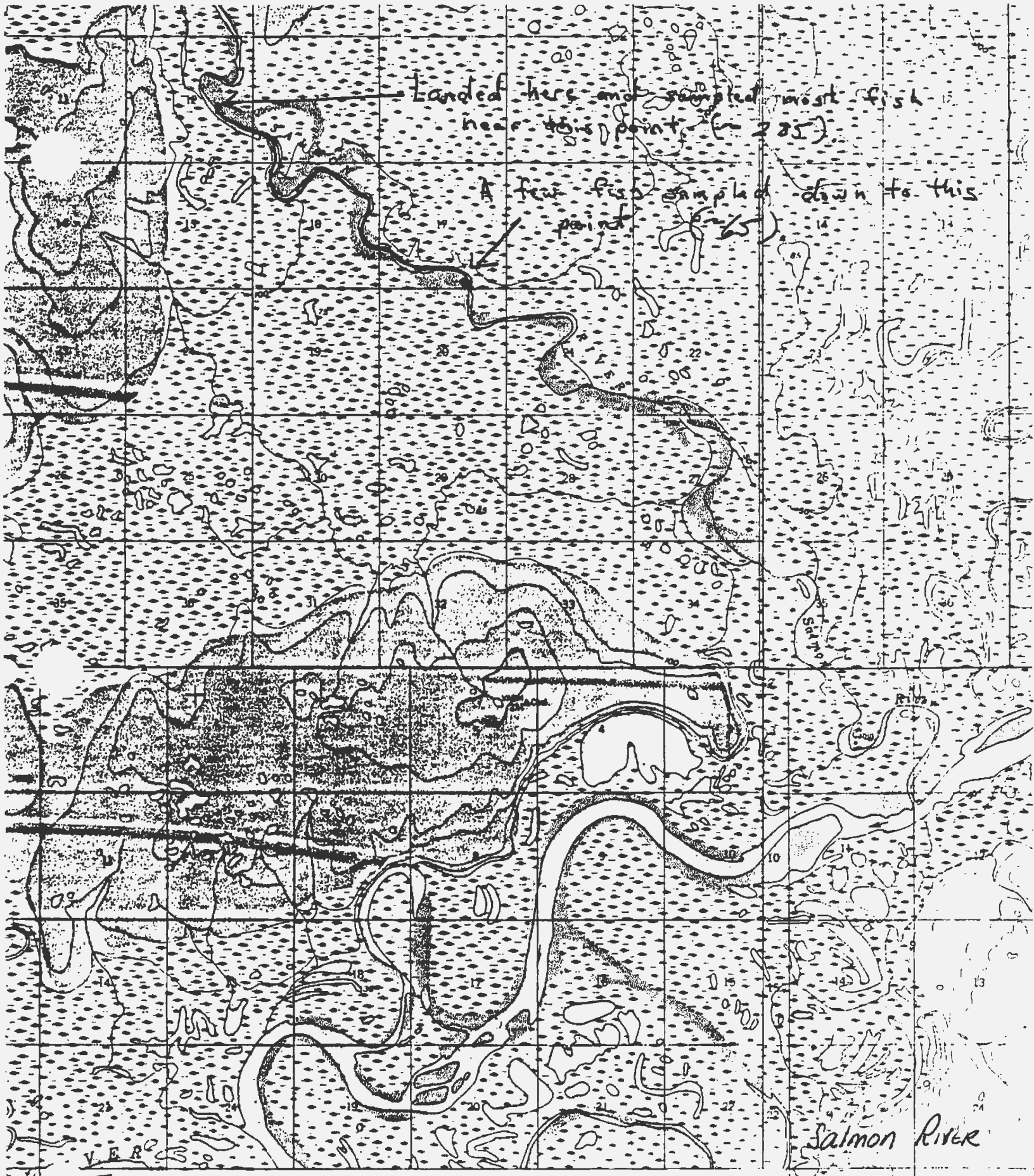

Figure 8. Salmon River

Upper Kobuk River
September 10-16, 1985

We (Mary Hausler and Doug Woodby) left Kotzebue on Tuesday, September 10 and took a commercial flight to Ambler. We left Ambler mid-afternoon, and flew with Dave Rue (Ambler Air Service) in a Cessna 185 on floats to Lake Minakokosa. Our gear consisted of one six gallon gas tank, a 9.9 hp outboard, a small 10 foot Achilles raft, two backpacks, one large boat bag, a small cooler, and two small bags of food. We would not have been able to fit much more gear into the plane. We camped that night on the southeast end of the lake (good lake trout fishing), and left midday on the 11th to float Beaver Creek to the Kobuk River. Due to a period of heavy rains in early September, Beaver Creek was at least 2-3 feet above normal for this time of year. The creek ends with a large cut bank (eastern bank) of glacial till where it joins a branch of the Kobuk. According to Art Mortvedt, (trapper on Lake Minakokosa) it is in this branch of the Kobuk, near its juncture with Beaver Creek that spawning activity is concentated (Figure 9). The channel forks about 200 yards from its junction with Beaver Creek. The right channel (looking upstream) is slower and more slough-like, and is reportedly the main spawning area. We spent several hours near the Beaver Creek outlet looking in all nearby Kobuk River channels for spawning fish and carcasses. We found only four carcasses and saw only one live fish. The water was murky, but we could see the bottom in most places and there was little evidence of fish.

We camped one night September 11 at the outlet of Beaver Creek, and departed the next day (in the rain) to head down the Kobuk. We spent the next night September 12 a few miles above Selby Slough and reached the Selby River the morning of September 13th. The slough comes in from the northeast about one half mile upstream of the river mouth. The river and slough were both very high, but we were able to see some chum salmon in the slough. Most were near the banks or swimming among the willows. The water was quite murky and a good estimate of the numbers of fish was difficult to make, but there were at least 500. We spent the rest of a the day attempting to catch fish by beach seining. This was difficult since there was no beach, and it was almost impossible to find a place to bring in the net without getting it hung up on snags. We managed to catch and sample 27 fish. That night it rained even harder, and the Kobuk River rose a couple more feet and continued to rise throughout the next day. We were no longer able to see any fish in the slough except when one occasionally broke the surface. We tried beach seining again with no success and then switched to drifting. We were able to catch a few fish by that method, but captured successively fewer each drift. We also used up quite a bit of our gas, and finally stopped prior to running out of gas and daylight. Most fish were probably still hanging close to the banks. We were not able to get very close due to all the snags. We caught a total of 51 fish for electrophoresis samples, and took about 60 scale samples. We had planned on putting the scales on scale cards, but were not able to pull them off live fish with any great success so we switched back to taking skin patches.

When we got back to our camp it became obvious that if the river continued to rise as much as it had in the last 12 hours we were in danger of being flooded out in the next 12 hours. It was beginning to get dark but we decided to move our camp. We found a good campsite a mile downstream on the north bank, and spent the night there. The next morning September 15 we headed downstream

bucking a strong wind. After freezing for about an hour we decided to wait until the wind died down. It finally dropped that night and we travelled down to Kobuk the next day. We spent a couple of hours in Kobuk trying to get a flight out, and finally reached Ambler in the late afternoon.

It was obvious to us early in the trip that it is not worthwhile spending time, effort, or money on the project if water levels are much higher than normal. The chances for successful sampling are extremely poor under such conditions. We would recommend that the project be conducted a week or two earlier than this season in order to sample during the peak of spawning, and take advantage of warmer temperatures and longer hours of daylight.

We started the trip with six gallons of gas which was sufficient to motor our small raft from Selby River to Kobuk even though we used one half gallon on the lake and two more gallons catching fish on Selby Slough. We floated from the lake down to Selby Slough. A larger boat or motor might require more gas for the trip, and possibly require two plane trips to get the gear to the lake.

The next day, September 16, was spent conducting a subsistence salmon survey in Ambler.

COSTS

KOTZ-AMBLER	202.59	$65 seat fare + excess baggage
AMBLER-LK MIN	320.00	1.6 hrs. at $200/hr
KOBUK-AMBLER	100.50	(higher than normal seat fare because of extra stop)
AMBLER-KOTZ	130.00	$65 seat fare
LODGING	250.00	Kobuk River Lodge, 2 people, 1 night, 4 meals.
FOOD	110.00	
TOTAL	$1,113.09	

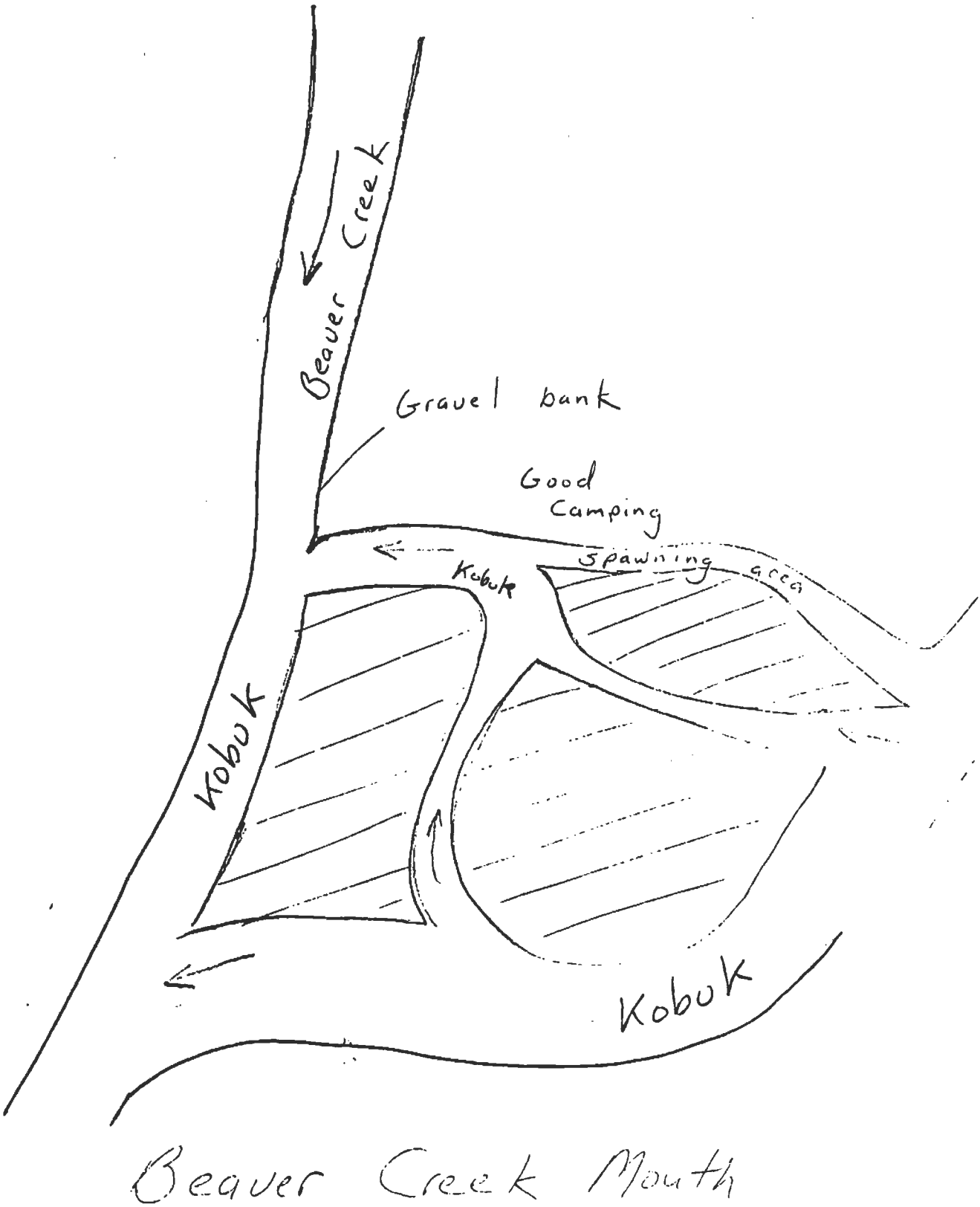

Figure 9. Beaver Creek mouth.

LITERATURE CITED

Davis, Robert H. and Carmen Otlito. In press. Preliminary investigations of genetic structure of chum salmon (Onchorhynchus keta) in the Noatak and Kobuk River drainage of northwestern Alaska. ADF&G, F.R.E.D. Division, Juneau, Ak. 24pp.